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EXAMINER

GRAYBILL, DAVID E

ART UNIT

2827

PAPER NUMBER

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/738,193

Applicant(s)

PIERCE, JOHN L.

Examiner

David E Graybill

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-17, 20, 22-24 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) 11 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-11, 13-17, 20, 23, 24 and 27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

In the paper dated 8-22-3, applicant refers to an interview on 8-21-3. However, there is no record of this interview in the application. Applicant is respectfully reminded that it is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file.

Applicant's election with traverse of the species wherein the adhesive forms a rigid bond, wherein each conductor is a solder ball, wherein the step of testing comprises testing the dies simultaneously, and wherein the step of testing comprises parametric testing, allegedly readable on claims 8-17, 20, 22-24 and 27-31, in the paper dated 8-22-3 is acknowledged. However, applicant's indication that claims 8-17, 20, 22-24 and 27-31 are readable on the elected species is incorrect. Rather, claims 8-11, 13-17, 20, 23, 24 and 27-31 are readable on the elected species.

The traversal is on the grounds that a search and examination can be made without serious burden. This is not found persuasive because the reasons for insisting on restriction as stated in MPEP 808 have been clearly met. The requirement is still deemed proper and is therefore made FINAL.

Claims 12 and 22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to the nonelected species wherein each conductor comprises a conductive-polymer adhesive, there being no allowable generic or linking claim.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The undescribed subject matter is the limitation "a material that will prevent adhesion of the substrate."

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 15 there is insufficient antecedent basis for the language "the first flat surface."

In claim 17 the scope of the limitation "wherein the cured B-Stage adhesive forms a rigid bond" cannot be determined because the term "rigid" is a vague relative term of degree for which the disclosure provides no clear

standard for measuring the degree, or it is not apparent if the degree is limited by the disclosure, and one of ordinary skill in the art in view of the prior art and the status of the art would not otherwise be reasonably apprised of the scope of the term.

In claim 17 there is insufficient antecedent basis for the language "the cured B-Stage adhesive."

In claim 31 the limitation "conforming the nonconforming groups" cannot be understood.

Claims 15 and 17 have not been rejected over the prior art because, in light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of the claims; hence, it would not be proper to reject the claims on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims. Also see *In re Wilson*, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970) (if no reasonably definite meaning can be ascribed to certain claim language, the claim is indefinite, not obvious). See also MPEP 2143.03 and 2173.06.

In the rejections infra, reference labels are generally recited only for the first recitation of identical elements.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Hirashima (6400019) and Blumberg (6387830).

At column 3, line 60 to column 6, line 46, and column 8, line 19 to column 11, line 24, Hirashima teaches the following:

A method of producing a semiconductor wafer-interposer comprising the steps of: attaching one or more first electrical contacts 7a to a lower surface of a substrate 1Bi comprising a B-Stage adhesive material material; attaching one or more second electrical contacts 7b to an upper surface of the substrate, the second electrical contacts having greater surface area and greater pitch than the first electrical contacts; and creating one or more first electrical pathways 10 passing through the substrate and connecting the first electrical contacts to the second electrical contacts, wherein the first and second electrical contacts are connection pads.

However, Hirashima does not appear to explicitly teach the substrate comprising a B-Stage adhesive material.

Nonetheless, at column 2, lines 41-49; column 4, lines 277; and column 5, lines 24-56, Blumberg teaches a substrate 100 comprising a B-Stage adhesive material. Furthermore, it would have been obvious to combine the process of Blumberg with the process of Hirashima because it would facilitate provision of the substrate of Hirashima.

Claims 10, 11, 13, 14, 16, 20, 23, 24 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirashima and Blumberg as applied to claims 8 and 9, and further in combination with Tsai (6489180).

As cited, Hirashima teaches the following:

A method for producing a wafer-interposer assembly comprising the steps of: attaching one or more first electrical contacts to a lower surface of a substrate, the substrate comprising a material; attaching one or more second electrical contacts to an upper surface of the substrate, the second electrical contacts having greater surface area and greater pitch than the first electrical contacts; creating one or more first electrical pathways passing through the substrate and connecting the first electrical contacts to the second electrical contacts; depositing a conductor 1BA on one or more third electrical contacts 6BP on an upper surface of a semiconductor wafer 1CS, the semiconductor wafer including one or more semiconductor dies 1CS and the third electrical contacts being associated with the semiconductor dies; aligning the substrate with the semiconductor wafer so that the

deposits of the conductor on the third electrical contacts correspond with the first electrical contacts on the lower surface of the substrate; attaching the substrate to the semiconductor wafer, wherein the first, second and third electrical contacts are connection pads, applying additional metallization 3, 6 to one or more of the third electrical contacts to redistribute them prior to the attachment of the substrate, adding additional metallization 3 to one or more of the third electrical contacts to improve the contact between the conductor and the third electrical contacts, wherein each conductor is a solder ball, attaching the substrate and semiconductor wafer assembly to a testing apparatus; and testing at least one of the semiconductor dies, wherein the step of testing the semiconductor dies further comprises performing parametric testing on at least one of the dies, the step of grading one or more performance characteristics of each semiconductor die during testing, singulating the substrate and semiconductor wafer assembly into one or more semiconductor die assemblies, and the step of sorting the semiconductor die assemblies based on the one or more performance characteristics.

To further clarify the teaching of attaching the substrate and semiconductor wafer assembly to a testing apparatus, and testing at least one of the semiconductor dies, performing parametric testing on at least one of the dies, the step of grading one or more performance characteristics of

each semiconductor die during testing, and the step of sorting the semiconductor die assemblies based on the one or more performance characteristics, it is noted that at column 6, lines 7-13, Hirashima teaches a "bending test." Moreover, it is inherent that parametric testing is performed in the bending test because a bending parameter is tested. In addition, it is inherent that the substrate and wafer assembly is attached to a testing apparatus during testing; at least, because the substrate and wafer assembly are attached to the "mobile telephone" and "push buttons" during a bending test. Also, a step of grading is inherent in the process of testing because it is inherent that the purpose of the testing is for sorting the dies. Similarly, the step of sorting the semiconductor die assemblies based on the bending performance characteristics is inherent in the bending test.

To further clarify the step of singulating the substrate and semiconductor wafer assembly into one or more semiconductor die assemblies, the substrate and wafer assembly are singular; therefore, it is inherent that they are singulated.

In addition, as applied supra, Blumberg teaches the B-Stage adhesive material.

Although as cited, Hirashima teaches applying a layer of underfill 1UF to the upper surface of the semiconductor wafer, Hirashima does not appear to explicitly teach that the underfill is "no-flow."

Regardless, at column 2, lines 5-8, Tsai teaches no-flow underfill 130. Moreover, it would have been obvious to use the no-flow underfill as the underfill of Hirashima because it would provide the underfill of Hirashima and help prevent short-circuits.

Claims 16, 23, 24 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirashima, Blumberg and Tsai as applied to claims 10, 11, 13, 14 and 20, and further in combination with Kline (6483043).

Hirashima does not appear to explicitly teach attaching the substrate and semiconductor wafer assembly to a testing apparatus, and testing at least one of the semiconductor dies, wherein the step of testing the semiconductor dies further comprises performing parametric testing on at least one of the dies, wherein the step of testing the semiconductor dies further comprises testing the semiconductor dies simultaneously, the step of grading one or more performance characteristics of each semiconductor die during testing, singulating the substrate and semiconductor wafer assembly into one or more semiconductor die assemblies, the step of sorting the semiconductor die assemblies based on the one or more performance characteristics, and sorting the semiconductor die assemblies into conforming the nonconforming groups.

Notwithstanding, at column 6, lines 21-45, Kline teaches this process. Furthermore, it would have been obvious to combine the process of Kline with the process of the applied prior art because it would enable testing.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to Group 2800 Customer Service whose telephone number is 703-306-3329.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947, or after about 02/05/04, (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is (703) 872-9306.



David E. Graybill
Primary Examiner
Art Unit 2827

D.G.
15-Dec-03